REMARKS

Applicants thank the Patent Office for acknowledging Applicants' claim to foreign priority, and for indicating that the certified copy of the priority document, European Patent Application No. 00402332.1 dated August 22, 2000, has been made of record in the file.

Applicants thank the Patent Office for initialing the references listed on the PTO-1449 form submitted with the Information Disclosure Statement filed on August 10, 2001, thereby confirming that the listed references have been considered.

Claims 1-15 have been examined on their merits.

Applicants thank the Patent Office for indicating that claims 4-15 are allowed. Applicants herein editorially amend claims 4-15 to remove reference callouts, "characterizing" language and to conform the claims to U.S. practice.

The Patent Office objects to claim 2 as being dependent upon a rejected base claim. Applicants thank the Patent Office for indicating that claim 2 would be allowed if rewritten in independent form. Applicants herein cancel claim 2, and incorporate its recitations into claim 1.

Claims 1 and 3-15 are all the claims presently pending in the application.

1.   The Patent Office objects to the Abstract of the Disclosure as containing the title of the application. Applicants herein amend the Abstract and submit that the objection has been overcome. Applicants respectfully request that the Patent Office withdraw the objection.

2.   The Patent Office objects to the specification as lacking section headings and other

informalities. Applicants herein cancel the present specification and are providing a Substitute

Specification that complies with 37 C.F.R. § 1.52(a)-(b) and 37 C.F.R. § 1.125(b). Applicants

respectfully request that the Patent Office withdraw the objection.

3.   Claims 1 and 3 stand rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by

Monin (U.S. Patent No. 6,243,358). Applicants traverse the 35 U.S.C. § 102(e) rejection of

claims 1 and 3 for at least the reasons discussed below.

Applicants herein incorporate that subject matter recited in claim 2 into claim 1, and

cancels claim 2 without prejudice and/or disclaimer. Since the Patent Office has indicated that

such a combination would be allowable over Monin, Applicants submit that claim 1 is now in

condition for allowance, and respectfully request that the Patent Office reconsider and withdraw

the § 102(e) rejection of claim 1.

Applicants herein rewrite claim 3 in independent form by incorporating the subject matter

recited in claim 1. To support a conclusion that a claimed invention lacks novelty under 35

U.S.C. § 102, a single source must teach all of the elements of a claim. *Hybritech Inc. v.*

Monoclonal Antibodies, Inc., 802 F.2d 1367, 1379, 231 U.S.P.Q. 81, 90 (Fed. Cir. 1986). The

cited reference must clearly and unequivocally disclose every element and limitation of the

claimed invention. With respect to newly independent claim 1, Monin lacks any teaching or

suggestion of at least a buffering element that notifies a line termination element to adjust

bandwidth-related conditions of network termination elements coupled to the line termination

element. Although the Patent Office argues that Monin discloses the buffering element (receiver 14) that notifies a line termination element (sender 10) to adjust bandwidth-related conditions, Monin does not teach or suggest the line termination elements nor does Monin teach or suggest controlling bandwidth-related parameters of the line termination elements. Monin simply discloses buffers (16) that accumulate data packets, and there is no teaching or suggestion that bandwidth-related conditions of the buffers are controlled by a buffering element in relation to a cell input/output rate.
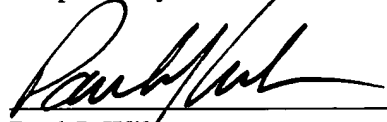
Based on the foregoing reasons, Applicants submit that Monin fails to teach or suggest all of the claimed elements as arranged in claim 3. Therefore, under *Hybritech*, Monin clearly cannot anticipate the present invention as recited in independent claim 3. Thus, Applicants submit that claim 3 is allowable, and respectfully request that the Patent Office reconsider and withdraw the § 102(e) rejection of claim 3.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. APPLICATION NO. 09/925,331
ATTORNEY DOCKET NO. Q65268

In view of the above, reconsideration and allowance of this application are now believed

to be in order, and such actions are hereby solicited. If any points remain in issue which the

Examiner feels may be best resolved through a personal or telephone interview, the Examiner is

kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue

Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any

overpayments to said Deposit Account.

Respectfully submitted,

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WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: July 7, 2005

COMMUNICATION METHOD, RELATED BUFFERING ELEMENT AND LINE TERMINATION ELEMENT

BACKGROUND OF THE INVENTION

[0001]   The present invention relates to a communication method to be used in a communication network comprising a buffering element, a line termination element and a plurality of network termination elements, wherein the buffering element is coupled to the line termination element, and the line termination element is coupled to each of the network termination elements over a shared medium~~as described in the preamble of claim 1~~.

[0002]   Such a communication method is already known in the art, e.g., from *"TCP/IP friendly APON MAC with traffic regulator"* from the authors K. Venken et al. This article is published in Proceedings ~~Proc.~~ of the 17th World Telecommunications Congress, WTC/ISS2000, 7-12 May 2000, Birmingham.

[0003]   Therein, a shared medium access network is described. The main function of such a shared-medium access network is to collect and multiplex traffic from several users and offer it to the core network and additionally to distribute the traffic from the core network to the relevant users. This involves the multiplexing and de-multiplexing of several connections. Typically, the access network has a point to multi-point topology where all traffic between the Network Terminations called the Optical Network Unit in the cited article and the core network flows through the line termination called the optical line termination of the access network in the cited article. Cells are broadcast in the downstream direction from line termination towards the Network Terminations. Multiple network terminations share the upstream direction as well as in the downstream direction. Therefore, a Medium Access Control further referred to as MAC function is needed for controlling the upstream channel. Centrally controlled request-based MAC protocols for Time Division Multiple Access transport systems are very well known. One time-slot corresponds with one cell. Different

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timeslots are dynamically assigned to different network terminations, under control of the MAC function implemented at the line termination.

[0004]   The allocation of time-slots is based on the traffic parameters, i.e., connection set-up information, and the Quality of Service requirements of the connections. Dynamic bandwidth allocation also takes into account the instantaneous traffic-needs of the connections, e.g., the number of waiting cells at the network terminations. The MAC-channel consists of the requests of the network terminations sent to the line termination and the permits broadcast from line termination to the network terminations.

[0005]   Additionally, it is well known in the art that the core network contains network elements, as described in *"A versatile RED based Buffer Management Mechanism for the efficient Support of Internet Traffic"* from the authors J. Nelissen and S. De Cnodder and published in November 1999 in Proc. SPIE Vol. 3842, p. 57-68, Internet II: Quality of service and future directions by R. O. Onvural et al. having limited buffering capabilities together with buffer acceptance capabilities, meaning that these network elements discard and/or mark incoming cells based on the filling degree of such a buffering element.

[0006]   As a consequence, in case cells are discarded by such a buffering element in the core network, the sending of this same discarded cell over the shared medium between the network terminations, and the line termination was superfluous in the meaning that instead a competing cell not to be discarded could have been sent.

<div align="center">BRIEF SUMMARY OF THE INVENTION</div>

[0007]   An aspect object of the present invention is to provide a communication method of the above known type, but wherein the sending of data over the shared medium between the network terminations and the line termination element is done more efficiently.

[0008]   According to the present invention, this aspect object is achieved by a communication method for a communication network comprising a buffering element, a line

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termination element and a plurality of network termination elements, wherein the buffering element being coupled to the line termination element, and the line termination element is coupled to each of the network termination elements over a shared medium, wherein the communication method interacts between the buffering element and the line termination element to adjust a cell input/output rate of the buffering element to at least one bandwidth related condition of each of the network termination elements, or vice versa~~the method as claimed in claim 1~~.

[0009] In this way, by enabling an interaction between the buffering element and the line termination element, to adjust the cell input/output rate of the buffering element, i.e., for instance a cell filling level of the buffering element, to at least one bandwidth related condition of the network termination elements or vice versa. The at least one bandwidth related conditions are conditions of the network terminations, such as dimensions of network termination buffer, corresponding configuration, connection information or queue size at the network termination elements. Hence, the data cells that are sent over the shared medium between the network terminations and the line termination are not discarded in the buffering element since their transmission is anticipated and the input/output rate is adapted in such a way that the transmission is always possible. Consequently~~As a consequence~~, these data cells are not sent superfluously, over the shared medium increasing in such way the efficiency of data sending over the shared medium.

[0010] It is to be noticed ~~notice~~that with a cell not only is referred to an ATM-cell but any kind of data-packet is meant whether fixed length or non-fixed length.

~~The present invention also relates to a communication method as described in claim 2.~~

[0011] The line termination element notifies the buffering element to adjust the cell input/output rate of the buffering element to the bandwidth related conditions, of the network termination elements. The buffering element consequently adjusts this cell input/output rate

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by, for instance, discarding other incoming cells, such as other low priority cells, adapting the output rate or adjusting the threshold level, of course all in correspondence with the bandwidth related conditions of the network termination elements. Hence, the data cells that are sent over the shared medium between the network terminations and the line termination are not discarded in the buffering element and hence these data cells are not sent superfluously, over the shared medium increasing in such way the efficiency of data sending over the shared medium.

~~The present invention also relates to a communication method as described in claim 3.~~

[0012]   The buffering element notifies the line termination element to adjust the bandwidth related conditions, such as ~~such as~~ dimensions of network termination buffer, corresponding configuration, connection information or queue size at the network termination elements, of the network termination elements, to the cell input/output rate of the buffering element. The buffering element only possesses a limited buffering capacity. To ~~In order to~~ optimally use this capacity without requiring the buffer acceptance mechanism to discard or mark cells of the cell stream, the buffering element notifies the line termination element to allocate more or less bandwidth to each or certain of the network termination elements in this way adjusting the bandwidth related condition of the network terminations. Hence, the data cells that are sent over the shared medium between the network terminations and the line termination are not discarded in the buffering element and hence these data cells are not sent superfluously, over the shared medium increasing in such way the efficiency of data sending over the shared medium.

[0013]   The present invention also relates to a buffering element and a line termination ~~according to claims 4 and 7 and~~ realizing ~~realising~~ the above described communication method.

[0014]   The line termination element notifies the buffering element to adjust the execution

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of the buffer acceptance mechanism based on conditions of the network termination elements such as dimensions, configuration, connection information or queue size at the network termination elements. The buffering element uses this notification together with a measured cell input/output ratio of the buffering part to instruct the buffer acceptance mechanism to act in such a way that, the buffering element consequently allocates a corresponding amount of space of the buffering part in correspondence with these conditions of the network termination elements.

[0015] Hence, the data cells that are sent over the shared medium between the network terminations and the line termination are not discarded in the buffering element and hence these data cells are not sent superfluously, over the shared medium increasing in such way the efficiency of data sending over the shared medium.

~~Additional features of the present invention are described in claims 5 and 6 respectively.~~

[0016] The criterion is a characteristic of the input flow of the buffering part or a cell filling level of the buffering part. Each criterion can be used for deriving an instruction for a policing part to discard or mark cells sent to the buffering element.

~~Further features of the present invention are described in claims 8 and 9 respectively.~~

[0017] The condition interpreting part is able to derive a bandwidth allocation for the network termination elements based on a condition of the network termination elements or is adapted to transparently pass a condition of the network termination elements for inclusion in a notification of the buffering element in order to instruct the buffer acceptance mechanism to act in such a way that, the buffering element consequently allocates a corresponding amount of space of the buffering part in correspondence with such a condition of the network termination elements.

[0018] The present invention also relates to a buffering element and a line termination ~~according to claims 10 and 13 and~~ realizing ~~realising~~ the above described communication

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method.

[0019] The buffering element notifies the line termination element of a measured cell input/output ratio of the buffering part in order to adjust the bandwidth allocated to each of the network termination elements in accordance with this measured cell input/output ratio of the buffering part. The line termination element uses this notification together with conditions of the network termination elements to reallocate bandwidth to each or certain of the network termination elements. Hence, the data cells that are sent over the shared medium between the network terminations and the line termination are not discarded in the buffering element and hence these data cells are not sent superfluously, over the shared medium increasing in such way the efficiency of data sending over the shared medium. ~~Other additional features of the present invention are described in claims 11 and 12 respectively.~~

[0020] The criterion is a characteristic of the input flow of the buffering part or a cell filling level of the buffering part. Each criterion can be used for deriving an instruction for a policing part to discard or mark cells sent to the buffering element. ~~Further additional features of the present invention are described in claims 14 and 15 respectively.~~

[0021] The criterion is a characteristic of the input flow of the buffering part or a cell filling level of the buffering part. Each criterion can be used for deriving an instruction for a policing part to discard or mark cells sent to the buffering element.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The above and other aspects ~~objects~~ and features of the invention will become more apparent and the invention itself will be best understood by referring to the following description of an embodiment taken in conjunction with the accompanying drawings wherein:

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[0023]   FIG. 1 represents an optical medium access network together with buffering element making part of the core network wherein the communication method of the present invention is executed;

[0024]   FIG. 2 represents the structural built-up of the buffering element BE and the line termination element LT as presented in FIG. 1 implementing a first embodiment; and

[0025]   FIG. 3 represents the structural built-up of the buffering element BE1 and the line termination element LT1 as presented in FIG. 1 implementing a second embodiment.

DETAILED DESCRIPTION OF THE INVENTION

[0026]   In the following paragraphs, referring to the drawings, two implementations of the method and related devices of the present invention will be described. In the first paragraph of this description, the main elements of the communications network as presented in FIG. 1, wherein the communication method is executed, are described. This part is succeeded by a description of all interconnections of the before mentioned network elements. In the subsequent paragraphs, at first the structural built up of the line termination element LT and the buffering element BE is described followed by all interconnections and next the second embodiment is described in the same way as the first embodiment. In the following paragraph, the actual execution of both implementations of the communication method are described.

[0027]   The essential elements of this communication network CN of the present invention is an optical medium access network, comprising an ~~consisting of a~~ optical line termination element LT, LT1 and a number of optical network termination elements NT_1, NT_2, NT_n and additionally there is a buffering element BE, BE1 within the core network.

[0028]   The buffering element BE, BE1 is coupled to the line termination element LT, LT1 over a packet switched network such as an ATM network or an IP network, and the line termination element LT, LT1 further is coupled to each of the network termination elements

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NT$_1$, NT$_2$, NT$_n$ via an optical shared medium OSM.

[0029]   The line termination element LT as presented in FIG. 2 contains a detection part CDP that is adapted to detect conditions for each of the network termination elements NT$_1$, NT$_2$, NT$_n$ by polling. These conditions for each network termination element NT$_1$, NT$_2$, NT$_n$ for instance are connection set-up information, Quality of Service ~~service~~ requirements of connections or instantaneous traffic needs of connections. The line termination element further contains a condition interpreting part CIP that is adapted to derive an interpretation of these conditions of the network termination elements NT$_1$, NT$_2$, NT$_n$. Additionally, there is a notification part NP that is able to notify the buffering element BE of the interpretation of the conditions of the network termination elements NT$_1$, NT$_2$, NT$_n$.

[0030]   The buffering element, as presented in FIG. 2, comprises a reception part RP that is adapted to receive a notification of the line termination LT on the interpretation of the conditions of the network termination elements NT$_1$, NT$_2$, NT$_n$, a buffering part BP that is adapted to store cells, sent to the buffering element and a measuring part MP that is adapted to detect if a cell filling level of this buffering part BP is exceeding a threshold value. Further, the buffering element BE comprises ~~comprise~~ an interpreting part IP that is able to interpret the received notification on the interpretation of the conditions of the network termination elements NT$_1$, NT$_2$, NT$_n$ together with the cell filling level exceeding a threshold value of the buffering part BP and subsequently to derive therefrom an instruction for the policing part PP whether or not to discard or mark the cells sent to the buffering element BE. Further there is a policing part PP that is able to discard or mark the cells sent to the buffering element BE based on based on instructions of the interpreting part IP.

[0031]   The line termination element LT has an input-terminal I$_2$ that is at the same time an input-terminal of the detection part CDP. The detection part CDP ~~in its turn~~ is coupled with an output-terminal to an input-terminal of condition interpreting part CIP, which ~~that in its~~

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turn is coupled with an output-terminal to an input-terminal of the notification part NP. Further, the notification part NP has an output-terminal that is at the same time an output-terminal O_1 of the line termination element LT. The data-path DP couples the input-terminal I_6 of line termination LT to the input-terminal I_0 of the buffering element BE that at the same time is an input-terminal of the buffering part BP. Additionally the buffering part BP is coupled with an output-terminal to an input-terminal of the measuring part MP that in its turn is coupled with an output-terminal to an input terminal of the interpreting part IP. The policing part PP has an input-terminal that is coupled to an output-terminal of the interpreting part IP and an output-terminal that is coupled to an input terminal of the buffering part BP. The interpreting part IP in its turn is coupled with an input terminal to an output-terminal of the reception part RP. The reception part RP has an input-terminal that is at the same time an input-terminal I_1 of the buffering element BE.

[0032]   In order to explain the execution of the first embodiment of the present invention it is assumed that the detection part CDP detects certain conditions of each of the network termination elements, such as an agreed upon Quality of Service service of a connection from network termination elements NT_1 and an instantaneous traffic need of the connection towards network termination elements NT_2. These conditions are forwarded to the condition interpreting part CIP, in this case a medium access control protocol that is able to allocate bandwidth to each network termination elements NT_1, NT_2, NT_n based on these conditions. The condition interpreting part CIP forwards the information concerning the allocated bandwidth and eventually information concerning the certain conditions of each of the network termination elements to the notification part NP that next sends a notification of the information concerning the allocated bandwidth and eventually information concerning the certain conditions of each of the network termination elements to the buffering element BE. Subsequently, the reception part RP of the buffering element BE receives the notification of

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the line termination LT on the information concerning the allocated bandwidth and eventual information concerning the certain conditions of each of the network termination elements and forwards the notification to the interpreting part IP that next interprets the notification. Based hereon together with the actual buffer filling status determined by the measuring part MP, the interpreting part PP instructs the policing part whether or not to discard cells sent to the buffering element in order to also reserve buffer space in the buffering part BP of the buffering element BE for the cells sent using the allocated bandwidth.

[0033] The buffering element BE1 as presented in FIG. 3, comprises a buffering part BP1 that is adapted to store cells that are sent to the buffering element BE1, a measuring part MP1 that is adapted to detect if a cell filling level of this buffering part BP is exceeding a threshold value of the buffering part BP1. Further, there is an interpreting part IP1 that is adapted to interpret the cell filling level exceeding a threshold value and subsequently to forward this interpretation towards the notification part NP1 of the buffering element BE1 that in-its-turn notifies the line termination element LT1 of an exceeded threshold value.

[0034] The line termination element LT1 as presented in FIG. 3 contains a medium access control part MACP1 that is adapted to allocate bandwidth to each of the network termination elements NT_1, NT_2, NT_n based on conditions of each network termination element NT_1, NT_2, NT_n, such as connection set-up information, Quality of Of-Service requirements of connections or for instance instantaneous traffic needs of connections. The line termination element LT1 further contains a detection part CDP1 that is adapted to detect these conditions of each of the network termination elements NT_1, NT_2, NT_n. Additionally, there is a granting part GP1 that in-its-turn-is adapted to send grants to each of the network termination elements NT_1, NT_2, NT_n. The number of grants refers to the amount of bandwidth that is allocated to each of the network termination elements NT_1, NT_2, NT_n. Further, there is a reception part RP1 that is able to receive the notification of the buffering element BE1 and forward this

notification towards the medium access control part MACP1. The access control part MACP1 is additionally is adapted to reallocate bandwidth to each of the network termination elements based on the notification concerning the cell filling level of the buffering part BP1 of the buffering element BE1.

[0035] The data-path DP1 couples the input-terminal I_7 of line termination LT to the input-terminal I_3 of the buffering element BE1 that at the same time is an input-terminal of the buffering part BP1. Additionally, the buffering part BP1 is coupled with an output-terminal to an input-terminal of the measuring part MP1 that ~~in its turn~~ is coupled with an output-terminal to an input terminal of the interpreting part IP1. The interpreting part IP1 ~~in its turn~~ is coupled with an output-terminal to an input terminal of the notification part NP1. The notification part NP1 has an output-terminal that is at the same time an output-terminal O_3 of the buffering element BE1.

[0036] The line termination element LT1 has an input-terminal I_4 that is at the same time an input-terminal of the detection part CDP1. The detection part CDP1 ~~in its turn~~ is coupled with an output-terminal to an input-terminal of the medium access control part MACP1[[,]] that with an output-terminal is coupled to an input-terminal of the granting part GP1 and additionally with an input-terminal is coupled to an output-terminal of the reception part RP1. The granting part GP1 has an output-terminal that is at the same time an output-terminal O_4 of the line termination element LT1. Further, the reception part RP1 has an input-terminal that is at the same time an input-terminal I_5 of the line termination element LT1.

[0037] In order to explain the execution of the second embodiment of the present invention it is assumed that the cell filling level of the buffering part BP1 currently is above the threshold value meaning that newly arriving cells will not be admitted to the buffering part BP1 but are discarded in advance. The measuring part MP1 detects that the filling level of the buffering part exceeds the threshold value and subsequently forwards this to the

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interpreting part IP1 that interprets the exceeding of the threshold value and formulates a notification for the line termination element LT1 based hereon. The notification part NP1 next notifies the line termination element LT1 of the cell filling level exceeding the threshold value and the corresponding cell filling level of the buffering part BP1. The reception part RP1 receives the notification of the buffering element BE1 and forwards it to the medium access control part MACP1 that reallocates the bandwidth on the optical shared medium OSM to each of the network termination elements based on the notification of the exceeded threshold level. The bandwidth is in such a way reallocated to each of the network termination elements NT_1, NT_2, NT_n that the network termination elements NT_1, NT_2, NT_n sending towards buffering element BE1 are limited in sending cells in favor ~~favour~~ of the network termination elements sending to other not presented buffering elements. In this way, the capacity on the optical shared medium OSM is optimum used and, at the same time, the buffering element BE1 is not overloaded resulting in a cell discard at this buffering element BE1.

[0038] It is to be remarked that the measuring part MP, MP1 in both embodiments is able to measure other parameters then the previously described one, such as characteristics of the cell input flow of the buffering part or some flow output characteristics of the buffering element.

[0039] Additionally, it is to be remarked the condition interpreting part CIP, in case of the first embodiment, may transparently forward the condition information to the buffering element in for interpretation by the interpreting part IP of the line termination LT. For instance, the queue-length of the network terminations may be used directly in the line termination for deriving an instruction for the policing part.

[0040] It is further to be remarked that in case of a low cell filling level of the buffering element BE1 the method performs also the other way round and is adapted to instruct the line termination element LT1 to allocate bandwidth in such a way that the cell filling level of the

buffering element BE1 increases to an optimum value in this way optimizing optimising the efficiency.

[0041] Additionally, it is to be remarked that the application of the present invention is not restricted to optical networks but may be applied in any shared medium network such as wireless networks or Hybrid Fiber Coax networks.

[0042] Although the above embodiment of the invention has been described by means of functional blocks, their detailed realization realisation based on this functional description should be obvious for a person skilled in the art and is therefore not described.

[0043] While the principles of the invention have been described above in connection with specific apparatus, it is to be clearly understood that this description is made only by way of example and not as a limitation on the scope of the invention, as defined in the appended claims.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the

application:

LISTING OF CLAIMS:

1. (*Currently Amended*) A communication ~~Communication~~ method for ~~to be used in~~ a

communication network comprising a buffering element, a line termination element and a

plurality of network termination elements, said buffering element ~~being~~ coupled to said line

termination element, and said line termination element ~~being~~ coupled to each of said network

termination elements over a shared medium, wherein ~~CHARACTERISED IN THAT~~ said

communication method comprises ~~includes the step of~~ interacting between said buffering

element and said line termination element to adjust a cell input/output rate of said buffering

element to at least one bandwidth related condition of each of said network termination elements,

wherein said line termination element notifies said buffering element to adjust said cell

input/output rate of said buffering element to said at least one bandwidth related condition of

said network termination elements ~~or vice versa~~.

2. (*Cancelled*).

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3. (*Currently Amended*) A communication method for a communication network comprising a buffering element, a line termination element and a plurality of network ·termination elements, said buffering element coupled to said line termination element, and said line termination element coupled to each of said network termination elements over a shared medium, wherein said communication method comprises interacting between said buffering element and said line termination element to adjust a cell input/output rate of said buffering element to at least one bandwidth related condition of each of said network termination elements, wherein ~~Communication method according to claim 1, CHARACTERISED IN THAT said step of interacting consists of~~ said buffering element notifies ~~notifying~~ said line termination element to adjust said at least one bandwidth related condition of said network termination elements to said cell input/output rate of said buffering element.

4. (*Currently Amended*) A buffering ~~Buffering~~ element ~~(BE)~~ to be used in a communication network ~~(CN)~~, said communications network ~~(CN) further~~ comprising a line termination element ~~(LT)~~ and a plurality of network termination elements ~~(NT₁, NT₂, NTₙ)~~, said buffering element ~~(BE)~~ being coupled to said line termination element ~~(LT)~~, and said line termination element ~~(LT)~~ being coupled to each of said network termination elements ~~(NT₁, NT₂, NTₙ)~~ over a shared medium ~~(OSM)~~, said buffering element comprises ~~(BE) comprising the following parts~~:

[[a.]]   a buffering part ~~(BP),~~ adapted to store cells sent to said buffering element ~~(BE)~~;

[[b.]]   a measuring part (MP), coupled with an input to an output of said buffering part

(BP) and adapted to determine a criterion based on a cell input/output rate of said buffering part;

[[c.]]   an interpreting part (IP), coupled with an input to an output of said measuring part

(MP) and adapted to interpret said criterion based on said cell input/output rate of said buffering

part (BP) and being adapted to derive therefrom an instruction for a policing part (PP) whether or

not to discard or mark said cells sent to said buffering element (BE),

[[d.]]   a policing part (PP), coupled with an input to an output of said interpreting part

(IP) and adapted to discard or mark said cells sent to said buffering element (BE), based on said

instruction of said interpreting part (IP), wherein **CHARACTERISED IN THAT** said buffering

element (BE) further comprises:

[[e.]]   a reception part (RP), coupled with an output to an input of said interpreting part

(IP) and adapted to receive a notification of said line termination (LT) containing an

interpretation of at least one condition of each of said network termination elements (NT₁, NT₂,

NTₙ), and that said interpreting part (IP) additionally is adapted to derive said instruction from

said notification of said line termination (LT) on said interpretation of said at least one condition

of each of said network termination elements (NT₁, NT₂, NTₙ).

5. (*Currently Amended*) The buffering Buffering element (BE) according to claim 4,

wherein **CHARACTERISED IN THAT** said criterion is a characteristic of cells sent to said

buffering element (BE).

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6. (*Currently Amended*) The buffering ~~Buffering~~ element ~~(BE)~~ according to claim 4, wherein ~~**CHARACTERISED IN THAT**~~ said criterion is a filling level of said buffering part ~~(BP)~~.

7. (*Currently Amended*) A line ~~Line~~ termination element ~~(LT)~~ to be used in a communication network ~~(CN)~~, said communication network ~~(CN) further~~ comprising a buffering element ~~(BE)~~ and a plurality of network termination elements ~~(NT₁, NT₂, NTₙ)~~, said buffering element ~~(BE)~~ being coupled to said line termination element ~~(LT)~~, and said line termination element ~~(LT)~~ being coupled to each of said network termination elements ~~(NT₁, NT₂, NTₙ)~~ over a shared medium ~~(OSM)~~, said line termination element ~~(LT)~~ comprising ~~the following parts~~:

[[a.]] a detection part ~~(CDP)~~ adapted to detect at least one condition of each of said network termination elements ~~(NT₁, NT₂, NTₙ)~~; and

[[b.]] a condition interpreting part ~~(CIP)~~ coupled with an input to an output of said detection part ~~(CDP)~~ and adapted to derive an interpretation of said at least one condition of each of said network termination elements ~~(NT₁, NT₂, NTₙ)~~, wherein ~~**CHARACTERISED IN THAT**~~ said line termination element ~~(LT)~~ further comprises:

[[c.]] a notification part ~~(NP)~~ coupled with an input to an output of said condition interpreting part ~~(CIP)~~ and adapted to notify said buffering element ~~(BE)~~ of said interpretation of said at least one condition of each of said network termination elements ~~(NT₁, NT₂, NTₙ)~~.

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8. (*Currently Amended*) The line ~~Line~~-termination element ~~(LT)~~-according to claim 7, wherein ~~CHARACTERISED IN THAT~~-said condition interpreting part ~~(CIP)~~-is adapted to derive a bandwidth allocation for each of said network termination elements ~~(NT₁, NT₂, NTₙ)~~ based on said at least one condition of each of said network termination elements ~~(NT₁, NT₂, NTₙ)~~.

9. (*Currently Amended*) The line ~~Line~~-termination element ~~(LT)~~-according to claim 7, wherein ~~CHARACTERISED IN THAT~~-said condition interpreting part ~~(CIP)~~-is adapted to transparently pass said at least one condition of each of said network termination elements ~~(NT₁, NT₂, NTₙ)~~.

10. (*Currently Amended*) A buffering ~~Buffering~~-element ~~(BE1)~~-to be used in a communication network ~~(CN)~~, said communications network ~~(CN) further~~-comprising a line termination element ~~(LT1)~~-and a plurality of network termination elements ~~(NT₁, NT₂, NTₙ)~~, said line termination element ~~(LT1) being~~-adapted to allocate bandwidth to each of said network termination elements ~~(NT₁, NT₂, NTₙ)~~, said buffering element ~~(BE1) being~~ coupled to said line termination element ~~(LT1)~~, and said line termination element ~~(LT1) being~~-coupled to each of said network termination elements ~~(NT₁, NT₂, NTₙ)~~-over a shared medium ~~(OSM)~~, said buffering element ~~(BE1)~~-comprising ~~the following parts~~:

[[a.]]   a buffering part ~~(BP1)~~,-adapted to store cells sent to said buffering element ~~(BE1)~~;

[[b.]]   a measuring part ~~(MP1)~~, coupled with an input to an output of said buffering part

~~(BP1)~~ and adapted to determine a criterion based on a cell input/output rate of said buffering

part; and

[[c.]]   an interpreting part ~~(IP1)~~, coupled with an input to an output of said a measuring

part ~~(MP1)~~ and adapted to generate an interpretation of said criterion based on said cell

input/output rate of said buffering part, wherein <u>wherein</u> ~~CHARACTERISED IN THAT~~ said buffering

element ~~(BE1)~~ further comprises:

[[d.]]   a notification part ~~(NP)~~, coupled with an input to an output of said

interpreting part ~~(IP1)~~ and adapted to notify said line termination ~~(LT1)~~ of said interpretation of

said criterion based on said cell input/output rate of said buffering part.

11. (*Currently Amended*) The buffering <u>The buffering</u> ~~Buffering~~ element ~~(BE1)~~ according to claim 10,

<u>wherein</u> ~~CHARACTERISED IN THAT~~ said criterion is a characteristic of cells sent to said

buffering element ~~(BE1)~~.

12. (*Currently Amended*) The buffering <u>The buffering</u> ~~Buffering~~ element ~~(BE1)~~ according to claim 10,

<u>wherein</u> ~~CHARACTERISED IN~~ that said criterion is a cell filling level of said buffering part

~~(BP1)~~.

13. (*Currently Amended*) <u>A line</u> ~~Line~~-termination element ~~(LT1)~~ to be used in a communication network ~~(CN)~~, said communication network ~~(CN) further~~ comprising a buffering element ~~(BE1)~~ and a plurality of network termination elements ~~(NT₁, NT₂, NTₙ)~~, said line termination element ~~(LT1)~~ being adapted to allocate bandwidth to each of said network termination elements ~~(NT₁, NT₂, NTₙ)~~, said buffering element ~~(BE1)~~ being coupled to said line termination element ~~(LT1)~~, and said line termination element ~~(LT1)~~ being coupled to each of said network termination elements ~~(NT₁, NT₂, NTₙ)~~ over a shared medium ~~(OSM)~~, said line termination element ~~(LT1)~~ comprising ~~the following parts~~:

[[a.]] a medium access control part ~~(MACP1)~~, adapted to allocate bandwidth to each of said network termination elements ~~(NT₁, NT₂, NTₙ)~~ based on at least one condition of each of said each network termination element ~~(NT₁, NT₂, NTₙ)~~;

[[b.]] a detection part ~~(CDP1)~~, coupled with an output to an input of said <u>a</u> medium access control part ~~(MACP1)~~ and adapted to detect said at least one conditions of each of said network termination elements ~~(NT₁, NT₂, NTₙ)~~; and

[[c.]] a granting part ~~(GP1)~~, coupled with an input to an output of said <u>a</u> medium access control part ~~(MACP1)~~ and adapted to send grants to each of said network terminations ~~(NT₁, NT₂, NTₙ)~~, indicating that a certain amount of bandwidth is allocated to each of said network terminations ~~(NT₁, NT₂, NTₙ)~~, <u>wherein</u> ~~CHARACTERISED IN THAT~~ said line termination element ~~(LT1)~~ further comprises:

[[d.]] a reception part ~~(RP)~~, coupled with an output to an input of said <u>a</u> medium access control part ~~(MACP1)~~ and adapted to receive a notification of an interpretation of a

criterion based on a cell input/output rate of said buffering part, and that said medium access

control part ~~(MACP1), additionally~~ is adapted to allocate said bandwidth to each of said each

network termination elements ~~(NT₁, NT₂, NTₙ)~~ based on said notification of said buffering

element ~~(BE1)~~.

14. (*Currently Amended*) The line ~~Line~~ termination element ~~(LT1)~~ according to claim 13,

wherein ~~CHARACTERISED IN THAT~~ said criterion is a characteristic of cells sent to said

buffering element ~~(BE1)~~.

15. (*Currently Amended*) The line ~~Line~~ termination element ~~(LT1)~~ according to claim 13,

wherein ~~CHARACTERISED IN THAT~~ said criterion is a filling level of a buffering part ~~(BP1)~~

of said buffering element ~~(BE1)~~.